8-5: Products with Radicals

Warm-up:

1. A rectangle has an area of 10 ft^2. Its length is $\sqrt{20}$ ft. Find the width.

2. $(3t)^5 = ?$

Recall that we can split up a product inside a radical as such: $\sqrt{ab} = \sqrt{a}\sqrt{b}$. This works due to the Power of a Product Postulate, which states $(xy)^m = x^m y^m$. Here, m can be an integer or a rational exponent (n^{th} roots). This is an idea that will allow us to simplify radicals, which is a very useful skill.

Root of a Product Theorem:

Example 1: Find the product: $\sqrt[3]{4} \cdot \sqrt[3]{16}$

Example 2: Assume $t > 0$. Write $\sqrt[7]{2t^4} \cdot \sqrt[7]{7t^2}$ as a single radical.

Just like we can combine the product of two radicals into one (as long as they have the same root!), we can take a radical and simplify it by breaking it up into factors that *are* perfect roots.

Example 3: Simplify $\sqrt[3]{128a^6b^3c^5}$.

Simplifying an n^{th} root:

Example 4: Simplify $\sqrt[4]{81x^8y^3}$.

Example 5: Simplify $\sqrt[3]{54x^5y^7}$.

Mean:

Geometric mean:

Example 6: Find the geometric mean of the integers 1 to 10 to the nearest hundredth.

Homework:

"While one person hesitates because he feels inferior, the other is busy making mistakes and becoming superior." - Henry C. Link